

SIX FLAGS NEW ENGLAND	
SUBJECT: CONCRETE & MASONRY GUIDELINES	SAFETY REFERENCE MANUAL
SECTION: 6	
EFFECTIVE: January 2016	SUPERSEDES: ALL PREVIOUS

## 6.1 PURPOSE

To provide safe practices and procedures to help safeguard employees and contractors against the hazards associated with concrete and masonry work.

## 6.2 OBJECTIVE

Establish basic requirements that employees and contractors shall comply with to help avoid hazards resulting from the premature removal of formwork, the failure to brace masonry walls, the failure to support precast panels, the inadvertent operation of equipment, and the failure to guard reinforced steel.

## 6.3 SCOPE

This section provides protection for all employees and contract employees from the hazards associated with concrete and masonry construction operations performed at Six Flags New England. All concrete and masonry work shall be supervised by a competent person. This policy also applies to the following equipment and operations:

- \* Bulk cement storage
- \* Concrete mixers
- \* Concrete buckets
- \* Pile driving operations
- \* Masonry saws
- \* Lock out/Tag out procedures

## 6.4 GENERAL REQUIREMENTS

No construction load(s) shall be placed on any portion of a concrete structure unless a competent person determines that the structure is capable of supporting the load(s).

All protruding reinforced steel that employees could come into contact with, shall be guarded or barricaded to prevent injuries.

Signs and barriers shall also be posted to limit employee access to a post-tensioning area during tensioning operations.

No employee shall be permitted to apply cement, sand and/or water mixtures through a pneumatic hose unless the employee is wearing head and face protection.

As stated in numerous parts of the Six Flags New England Safety Reference Guide, all

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construction areas must be barricaded from start to completion to discourage unauthorized entrance to the site. To help ensure personal safety, any Six Flags New England employee who is not directly involved with a construction project, shall not travel through barricaded areas.

## 6.5 CAST-IN-PLACE CONCRETE

### A. Formwork

Formwork is the total system of support for freshly placed or partially cured concrete, including the molding and sheeting that is in contact with the concrete as well as all supporting members, including shores, reshores, braces, and hardware.

Formwork must be designed, fabricated, erected, supported, braced, and maintained so that it will be capable of supporting, without failure, all vertical and lateral loads that may be applied to it.

The ends of exposed rebar shall be covered by safety caps.

### B. Drawings and Plans

Drawings and plans, including all revisions for the jack layout, formwork (including shoring equipment), working decks and scaffolding, must be available at the job site before the job commences.

### C. Shoring and Reshoring

**Shoring** - A supporting member that resists a compressive force imposed by a load that braces the walls of the excavation with timber or mechanical means on a vertical plane to prevent cave-in.

**Re-shoring** - means the construction equipment in which shoring equipment (re-shores) is placed, as the original forms and shores are removed, in order to support partially cured concrete and construction loads.

1. All shoring equipment must be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings. Damaged or weakened shoring equipment shall be immediately discarded from use.
2. The sills for shoring shall be sound, rigid, and capable of

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carrying the maximum intended load.

3. All base plates, shore heads, extension devices, and adjustment screws shall be in firm contact, and secured with the foundation and the form.
4. **Single Post Shores** - Single post shores shall be spliced and aligned vertically. They shall be adequately braced in two mutually perpendicular directions at the splice level. After this, each tier must be **diagonally** braced in the same two directions.

**Note:** Adjustments of single post shores to raise formwork shall not be made after the placement of concrete.

5. Whenever the concrete is required to support loads in excess of its capacity, reshoring shall be erected, as the original forms and shores are removed.

## 6.6 REQUIREMENTS FOR EQUIPMENT & TOOLS

### A. Concrete Buckets

1. No employee will be permitted to ride in concrete buckets.
2. No employee will be permitted to work under concrete buckets which are being elevated or lowered into position.
3. Buckets shall be directed in a manner where they pass over an area where the fewest number of people are exposed below the bucket.

### B. Concrete Mixers

Concrete mixers with one cubic yard or larger loading skips shall be equipped with the following:

- a. A mechanical device to clear the skip of materials
- b. Guardrails installed on each side of the skip

### C. Power Concrete Trowels

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Powered and rotating type concrete troweling machines that are manually guided shall be equipped with a control switch that will automatically shut off the power whenever the hands of the operator are removed from the equipment's control handles.

#### **D. Concrete Pumping Systems**

Concrete pumping systems that use discharge pipes shall be provided with pipe supports that are designed by the manufacturer that can handle a 100 percent overload, if necessary. **Compressed air hoses** used on a concrete pumping system must be fitted with positive fail-safe joint connectors to prevent separation of the sections when pressurized.

### **6.7 BULK CEMENT STORAGE**

Bulk storage bins, containers, and silos shall be equipped with the following:

Coned or tapered bottoms and a mechanical or pneumatic means of starting the flow of materials.

No employee shall be allowed to enter storage containers unless the ejection system has been shut off, locked out and tagged to indicate that the ejection system is not to be operated.

### **6.8 VERTICAL SLIP FORMS AND "JACKING OPERATIONS"**

The steel rods or pipes on which jacks are placed to lift the forms shall be specifically designed for that purpose and adequately braced when not encased in concrete. Forms shall be designed to prevent excessive distortion of the structure during the form lifting operation.

Scaffolding or other approved types of work platforms shall be provided on all vertical slip forms where employees are required to work or pass.

Jacks and vertical supports shall be positioned in a manner where the loads do not exceed the rated capacity of the jacks, as specified by the manufacturer of the jacks.

The jacks or other approved lifting devices must be provided with mechanical or automatic holding safety devices to support the vertical slip forms in the event of power failure of the supply or lifting device. No more than 14 jacks may be used during any jacking operation.

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The form structure shall be maintained within all design tolerances specified for plumpness during the lifting operation. The predetermined safe rate of the lift shall not be exceeded for any purpose during the lifting phase.

Only those employees who are directly involved with the lifting operation shall be permitted in the work area, unless a qualified person determines that the structure has been sufficiently reinforced to ensure its integrity during erection.

**Employees shall not be allowed to be underneath a slab while it is being lifted, regardless of the circumstances.**

## 6.9 REINFORCING STEEL

Reinforced steel for walls, piers, columns, and similar vertical structures shall be adequately supported to prevent overturning and/or collapse.

Appropriate measures shall be taken to prevent unrolled wire mesh from recoiling. Such measures may include securing each end of the roll or simply turning over the roll.